DOCUMENT RESUME

ED 428 178 CE 078 028

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TITLE A Comparison of the Perceived Benefits of Selected Activities between Capstone and Non-capstone Courses in a College of Agriculture. Journal Paper No. J-17935.
INSTITUTION Iowa Agricultural and Home Economics Experiment Station, Ames.
PUB DATE 1998-12-00
NOTE 12p.; Paper presented at the American Vocational Association Convention (New Orleans, LA, December 10-13, 1998).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Agricultural Education; Comparative Analysis; *Education Work Relationship; *Educational Benefits; Educational Research; Graduate Surveys; Higher Education; Rewards; Student Attitudes
IDENTIFIERS *Capstone Courses

ABSTRACT

A study determined which activities in a capstone course were perceived to be the most beneficial to course completers with regard to their first professional position after graduation. It also compared the quality of selected capstone activities to other junior/senior level courses in the College of Agriculture at Iowa State University. A random sample of 214 students--150 registered agriculture studies majors, 38 agricultural education majors, and 26 other majors--completed a questionnaire after taking a departmental capstone class required of all graduating agricultural studies majors. Part One of the questionnaire identified the benefits of the course to the first agricultural position of the completers. A five-point Likert-type scale was used that ranged from one (strongly disagree) to five (strongly agree). Part two contained 10 comparison questions asking respondents to compare selected experiential learning activities from the capstone course with other courses taken. Findings were as follows: respondents felt course activities were beneficial to them in their first professional position; a significant difference was found in the benefits of the capstone course to the respondent's first professional position when grouped by employment area; more recent graduates tended to value the perceived benefits slightly more; and the capstone course provided more or greater than opportunities and interactions than other junior/senior level agricultural courses. (Contains 15 references.) (YLB)

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ED 428 178

A COMPARISON OF THE PERCEIVED BENEFITS OF SELECTED ACTIVITIES BETWEEN CAPSTONE AND NON-CAPSTONE COURSES IN A COLLEGE OF AGRICULTURE*

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*Journal Paper No. J-17935, of the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa, Project No. 3374, and supported by the Hatch Act and State of Iowa Funds.

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A COMPARISON OF THE PERCEIVED BENEFITS OF SELECTED ACTIVITIES BETWEEN CAPSTONE AND NON-CAPSTONE COURSES IN A COLLEGE OF AGRICULTURE*

Introduction/Theoretical Framework

Capstone courses offer a viable option for addressing the concerns of providing a setting for the infusion of experiential learning. The Association of American Colleges (AAC) recommends the inclusion of capstone courses throughout all collegiate disciplines. Likewise, the ACC recommends that capstone courses be regularly required courses "pulling the disparate pieces of student's work together" (AAC, 1985, p. 17).

In 1985, the Association of American Colleges (AAC) published its report entitled *Integrity in the College Curriculum: A Report to the Academic Community.* This report addressed concerns about the decay in the quality of the Nation's Colleges and Universities. The findings support a minimum required curriculum which should include the following items: inquiry, literacy, understanding numerical data, historical consciousness, science, values, art, international and multi cultural experiences, and study in depth. Study in depth was defined as a central core of theory and method, a range of topics, a sequence with advancing sophistication, and a means by which final mastery of a discipline's complexity can be shown and assessed (Wagenaar, 1993). This description forms the basis of a capstone course.

There are several criteria by which quality capstone courses can be measured. These courses require a planned learning experience, require students to synthesize previously learned subject matter content with new information, and integrate this new information into a base for solving real wold problems (Crunkilton, Cepica, & Fluker, 1997), and provide a culminating experience which is carefully monitored so that students achieve their stated objectives (Knowles & Hoefler, 1995; Aupperle & Sarhan, 1995). Crunkilton et al also noted that capstone courses should ease the transition between students academic experience and career entry.

Purpose/Objectives

The purpose of this study was to determine which activities in a capstone course were perceived to be the most beneficial to course completers with regards to their first professional position after graduation. Further, this study sought to compare the quality of selected capstone activities to other junior/senior level courses in the College of Agriculture at Iowa State University. Specific objectives of this study were:

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1. To describe the demographics of capstone course completers.
2. To identify the perceptions of the benefits of selected capstone activities to their first professional employment areas.
3. To compare the quality of selected capstone activities with activities in other junior/senior level agricultural courses.

Methods/Procedures

This study used a descriptive survey design. This type of research is grounded in the need to "describe and interpret what is." (Ary, Jacobs, & Razavieh, 1985). Descriptive survey research's advantages are that it can provide a plethora of information from a wide variety of individuals. These data can then be utilized to produce information about various aspects of education (Borg & Gall, 1989), which, in turn, leads to the improvement of education and educational delivery systems.

The population for this study consisted of the 335 course completers that were enrolled between Fall semester 1991 and Summer semester 1996. This time frame was selected because no known research data had been gathered on these course completers. Independent random samples were generated following the model set up by Krejcie and Morgan (1970). A total random sample of 214 course completers was utilized, with 150 registered as Agriculture Studies majors, 38 as Agricultural Education majors, and 26 as other majors.

Based upon the objectives of this study, a questionnaire was developed by the investigator. Instrument items were selected from related studies and content determined by utilizing the researcher's background, a review of related studies (Soomro, 1991; Stevenson, 1985; Hamilton, 1979), input from faculty and staff familiar with the capstone course, and the researcher's graduate committee.

The questionnaire was pilot tested utilizing the Fall 1997 AgEdS 450 class to ensure face validity and to test the reliability of the instrument. Reliability coefficients were calculated resulting in scores of .93 for Part I and .79 for Part II.

The AgEdS 450 course is a departmental capstone class required of all graduating Agricultural Studies majors and offered as an elective course for other College of Agriculture majors. The Agricultural Studies major is a general agriculture degree offered through the Agricultural Education and Studies Department at Iowa State University.

Part I identified the benefits of the course to the first agricultural position of the completers. A five point Likert-type scale was used which ranged from 1 signifying "strongly disagree", 2 signifying "disagree", 3 signifying "undecided", 4 signifying "agree", to 5 signifying "strongly agree."

Part II of the questionnaire contained ten comparison questions asking the respondents to compare selected experiential learning activities from the capstone course with other courses taken. Respondents selected one choice of either "less than," "equal to," or "more than" as it related to the comparison being made between the capstone course other junior/senior level courses they had taken.

Demographic data were gathered to better understand the research findings, to develop a profile of the respondents, and to make comparisons among different responding groups. The cover letter, questionnaire and a self-addressed stamped envelope were mailed to the sample selected from the target population in November, 1997 following the Dillman Total Design Method (Dillman, 1978) A total of 134 usable instruments were returned for a response rate of 62.6%. A random survey of non-respondents indicated no significant difference between early respondents and non-respondents, early respondents and late respondents, and late respondents and non-respondents. Therefore, the results of this study may be generalized to the population from which the sample was drawn.

Findings/Results

Objective 1: To describe the demographics of capstone course completers.

Selected demographic information was obtained from the questionnaire completers. The vast majority of students enrolling in the capstone course were male (85%), had a farm background (94.1%), and enrolled in the capstone course one time (84.4%). Five undergraduate curricula were represented in the sample. Agricultural Studies with 90 respondents (71.4%), Agricultural Education (16.7%), Agricultural Business (9.5%), Animal Science and Agronomy majors accounted for less than 2% of the total sample.

Working in a farming operation (farm management: family or non-family) was the first professional position of nearly 40% of the sample. Industry jobs relating to agricultural sales and service accounted for an additional 25%. Seventeen percent of the respondents indicated "*other*" as their first professional position. These positions included such jobs as: researcher, loan officer, military service, entrepreneur, graduate school, and non-agricultural business. Agribusiness management and teaching accounted for less than 15%.

Students may enroll in the capstone course, AgEdS 450 during the Spring, Summer, or Fall semesters and may enroll more than once in different semesters. There was a fairly equal distribution by term and year of graduation with the exception of 1992 and 1997. These years accounted for less than 5% of the responses. No responses were received from former participants in the Summer, 1992 and Summer, 1996. Responses

were received from 67 former participants from the Spring of 1992 through the Fall 1994 and 68 graduates from Spring, 1995 through Summer, 1997.

Objective 2: To identify the perceptions of the benefits of selected capstone activities to their first professional employment areas.

Objectives 2 of this study was to determine the perceptions of course completers regarding the benefits of selected capstone activities. Section 1 of the questionnaire asked respondents to indicate their level of agreement or disagreement with statements reflecting the beneficial aspects of the capstone course, AgEdS 450.

Table 1 shows the means and standard deviations related to course activities within the capstone course. Respondents perceived the application of knowledge learned from other courses into the capstone course, to be the most beneficial (4.22) followed by preparing both written and oral presentations and reports. Encouraging students to seek information from ISU extension staff (3.59) and using a variety of assessment procedures (3.60) were rated as the least beneficial. The grand mean for all course activities was 3.87.

Table 1. Means and standard deviations of perceived benefits of the capstone course, AgEdS 450 relating to course activities in preparation for first professional position[a]

Course activity	**Mean**	**SD**
Apply knowledge gained from other courses	4.22	.68
Preparing and presenting reports	4.02	.70
Developing respect for different ideas	3.91	.69
Variety of assessment procedures	3.60	.77
Seek information from ISU extension	3.59	.92
Grand mean	3.87	.47

[a]1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

Objective 3: To compare the quality of selected capstone activities with activities in other junior/senior level agricultural courses.

The third objective of this study was to identify the perceptions of course completers regarding selected capstone activities utilized in AgEdS 450. Within this objective was the need to compare selected opportunities and interactions presented to

students enrolled in the capstone course to similar junior and senior level agricultural courses that they had taken at Iowa State University. Table 2 provides information regarding these comparisons. Respondents were asked to indicate whether AgEdS 450 had "fewer or less than," "equal to," or "more or greater than" opportunities and/or interactions than other junior or senior level agricultural courses for the identified variables.

Respondents indicated that AgEdS 450 provided more "hand-on activities" (92.6%), "student-student interactions" (88.9%), "learning through experiences" (88.1%), and "student directed learning" (81.3%) than other junior and senior level agricultural courses. This would be consistent capstone course objectives previously described in this study and is also consistent with many of the class activities implemented as part of the course curriculum. The lowest rated variable was "material previously learned in other courses." Only 45.2% of the respondents felt that AgEdS 450 provided more opportunities to use previously learned material than in other junior or senior level courses. For all the variables identified (10 in total), there was almost universal agreement that other courses provided "fewer" opportunities and interactions than the capstone course, AgEdS 450.

Table 2. A comparison of selected variables between the capstone course AgEdS 450 and other junior/senior level courses

	Factors in the capstone course					
	Less than other courses		Equal to other courses		Greater than other courses	
Variable	f	%	f	%	f	%
Hands-on activities	0	(0.0)	10	(7.4)	125	(92.6)
Student-student interaction	0	(0.0)	15	(11.1)	120	(88.9)
Learning through experiences	0	(0.0)	16	(11.9)	119	(88.1)
Student directed learning	0	(0.0)	25	(18.7)	109	(81.3)
Opportunities to plan activities	1	(0.7)	31	(23.1)	102	(76.1)
Put course objectives into practice	5	(3.7)	28	(20.7)	102	(75.6)
Problem solving/ decision-making	5	(3.7)	51	(37.8)	79	(58.5)
Teacher-student interaction	16	(11.9)	44	(32.6)	75	(55.6)
Material previously learned in other classes	17	(12.6)	57	(42.2)	61	(45.2)
Goal setting	6	(4.4)	50	(37.0)	79	(58.5)

Analysis of variance tests (ANOVA) and the Scheffe post hoc analysis were run to identify significant differences between the selected variables. An alpha level of 0.05 was used throughout all analyses. The results of the ANOVA are found in table 3.

When compared by gender, there were no significant differences in the perceived benefits of AgEdS 450 regarding course activities. Students with and without farm backgrounds prior to enrolling in the capstone course perceived course activities to be of benefit to them in their first professional position after graduation. Students with no prior farm background rated the benefits of the course activities slightly higher (4.27) than did the students with farm backgrounds (4.15), however no categorical difference was noted.

The analysis of variance for perceived benefits of course activities indicated a significant statistical difference between groupings by first professional position after graduation. Those who indicated teaching as their first professional position rated both the experiential learning activities and course activities significantly higher ($p<0.05$) than did those respondents indicating farming or other professional areas of employment.

Table 3. Test of significance of capstone course activities by selected demographic variables

	Course Activities				
Demographic Variable	n	M	SD	F-ratio	F-prob
Gender					
Male	114	3.85	.45		
Female	19	3.97	.57	.947	.332
Background					
Farm	126	3.86	.47		
Non-farm	7	3.94	.50	.103	.902
Employment Area					
Farming	53	3.82[a]	.45		
Teaching	6	4.43[a]	.39		
Other	68	3.86[a]	.46	5.001	.008
Semester					
Fall	52	3.82	.50		
Spring	48	3.88	.46		
Summer	13	4.02	.57	.621	.603
Term and Year of Graduation					
Spring 92-Fall 93	26	3.75	.33		
Spring 94-Fall 95	69	3.83	.50		
Spring 96-Summer 97	39	4.00	.48	2.529	.084

Committee Assignment				
Livestock	41	3.89	.50	
Machinery/Building & Grounds	24	3.96	.55	
Crops	33	3.79	.38	
Finance/Marketing 20	3.93	.50	.637	.593

[a]Means are significantly different.

There were no significant statistical differences in the perceived benefits of the capstone course by semester of enrollment. All groups agreed that the course was beneficial to their first professional position. Neither were there any significant statistical differences between group 1 (Spring semester 1992 - Fall semester 1993), group 2 (Spring semester 1994 - Fall semester 1995) or group 3 (Spring semester 1996 - Fall semester 1997) regarding capstone course activities. The term and year of graduation did not play a significant factor in the perceived benefits of these activities.

No distinctions regarding the perceived benefits of the course activities were noted between committees. All course participants were assigned to a class committee based on their individual interests and were responsible for their respective managerial area of the Ag450 farm. Members of all class committees agreed that the selected variable was beneficial in preparing them for their first professional position.

Summary/Conclusions/Recommendations

Capstone courses are prevalent among all disciplines in colleges and universities across the nation. They provide an opportunity to incorporate previously learned, often disjointed, information into an interconnected, contextual frame of reference from which to transition into a career or further study.

The types of activities selected for employment in capstone courses are critical if these courses are to truly be capstone in nature. These summative aspects of the capstone course and the required pedagogical characteristics allow for the assimilation of this disjointed information. Because of the nature of capstone courses and their roles within colleges and departments careful adherence to these principles must be maintained (AAC, 1985).

Based on the findings of this study, the following conclusions and recommendations are offered:

1. Respondents indicated that course activities were beneficial to them in their first professional position. Applying the knowledge gained from other courses rated the highest in this group with a mean score of 4.22, followed by preparing and presenting reports and developing respect for

different ideas. The grand mean for course activities was 3.87.

2. A significant difference was found in the benefits of the capstone course to the respondent's first professional position when grouped by employment area. Respondents indicating teaching as their first position rated the course activities significantly higher than respondents marking farming or other as their first position.

3. Regarding the course activities, even though there were no significant differences observed for some categories, the group means for the more recent graduates tended to be higher than the earlier graduates. This would suggest that the more recent graduates tended to value the perceived benefits slightly more than the earlier course graduates.

4. Without exception, respondents indicated that the capstone course, AgEdS 450, provided "more, or greater than" opportunities and interactions than other junior or senior level agriculture classes taken by course completers. Rating extremely high were hands-on activities, student to student interaction, learning through experiences, and student-directed learning. Frequencies for this section ranged from 45% to 93% agreement.

5. When asked to compare the departmental capstone course to other junior and senior level agriculture courses they had taken, overwhelmingly respondents indicated that the capstone course, AgEdS 450, had greater amounts of important interactions and provided more opportunities for students.

6. AgEdS 450 clearly fits the Crunkilton et al. (1997) definition of a capstone course with educational outcomes of problem solving, decision-making, critical thinking, collaborative/professional relationships, oral communication, and written communication.

Implications

Implications can be drawn from this study and applied to capstone courses in Colleges of Agriculture. The findings of this study along with the review of literature give a clear view of the importance of course activities to capstone courses. Each component serves as an integral part of the entire process. The capstone course is intended to be a preparatory stage for entering the world of work. They create an awareness in the student of the inter-connectiveness of curriculum, personalities and individuals, as well as teamwork and delivery methods.

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